REDUCING PREGNANCY SMOKING AND ASSOCIATED LOW BIRTH WEIGHT BIRTHS
Tennessee Tobacco Settlement Program 2014-16

Statewide pregnancy smoking reduced by 16.3% from 16.1% from 2013 (base year) to 13.4% in 2016 (intervention year 3).

The improvement was widespread. 71 of 95 counties demonstrated reductions.

Low birth weight births were 105% lower for women enrolled and receiving smoking cessation services during three or more prenatal visits compared to all statewide non-enrolled women who smoked during pregnancy (5.8% versus 11.9%).

Background

Tennessee has suffered poor national rankings for adult smoking, pregnancy smoking and youth smoking for many years. Targeted prevention resources had been limited to Federal categorical grants for time of busy public health department educators and unreimbursed efforts of other health systems providers. In 2013 the Tennessee General Assembly approved Governor Haslam's request to use $15 million over three years of unexpected excess Master Tobacco Settlement funding to support county-based tobacco use prevention activities. The Tennessee Department of Health (TDH) developed the initiative around three prevention Topics: reducing pregnancy smoking and related low birth weight births (LBW); reducing second hand smoke exposure around preschoolers and related use of hospital emergency departments for tobacco-induced asthma; and helping young children to choose not to begin use tobacco. For each Topic, counties completed its own assessment, determined its own numeric goal for change, selected county appropriate strategies and chose intervention projects to invest Tobacco Settlement funding. Over three years, $3,077,000 was expended by 95 counties to reduce pregnancy smoking through multiple projects. To evaluate the effectiveness of the interventions, TDH tracked county-specific project enrollments and changes in pregnancy smoking and low birth weight birth percentages. This report summarizes results and findings of the three-year effort.

Methods

Ninety-five counties were provided pregnancy smoking and low birth weight birth data for an October 2013 Tobacco Settlement Program Planning Day. Several best practices identified from literature and CDC web sites were presented by a TDH Rising Stars team. Counties were provided with annualized three-year budget allocations and developed three-year investment plans, to be updated annually, with county-specific goals for change and numeric outcome measures. Each county was responsible to conduct one project for the Topic of Pregnancy Smoking. Over three years, all 95 counties chose and implemented pregnancy smoking prevention and cessation projects.

By Year 3 eighty-eight counties invested funds in one national best practice, the BABY & ME Tobacco Free (BMTF) model. Three counties selected the SMART Moms model (with assistance from Middle Tennessee State University), one the T.I.P.S. model (East Tennessee State University) and one Colorado cessation program. Six counties developed local interventions including Knox County's Power to Quit, Shelby County's targeted interventions with pregnant teens and incarcerated women, Williamson County's classes for Hispanic clients, and Warren County's group classes entitled Nurturing parenting. Multiple counties supplemented direct cessation services with various forms of community education and recruitment projects. All counties included referrals to the Tennessee QUITLINE in project protocols. Table 1 displays the timeline for counties' project start dates and enrollment. In total, over three years, 8,725 women were provided cessation services.

TABLE 1: Timeline of implementation of Pregnancy Smoking projects with cumulative enrollment, 2014-16

1-6/2014	7-12/2014	1-6/2015	7-12/2015	1-6/2016	7-12/2016

New counties BABY&ME Tobacco Free	44	22	17	1	3	1
New projects locally developed	4	2	1	0	3	0
Cumulative and combined annual projects enrollment		1303		4535		8725

TDH epidemiologists conducted a descriptive study using the Tennessee Birth Certificate Registry to identify characteristics of women who smoked during pregnancy from 2004-2013 (Ten-Year Trends, Socio-demographic and Maternal Characteristics Associated with Smoking during Pregnancy among Tennessee Women, Internal TDH Report). This assessment found approximately 1 in 5 Tennessee women smoked before pregnancy (compared to 23% in US), and only 22% of those women who smoked reported quitting prior to pregnancy. Demographically, White women, women who had previous pregnancies, those with low educational attainment and unmarried women were most likely to smoke during pregnancy. Non-Hispanic Black and Hispanic women were at least 75% less likely than non-Hispanic White women to engage in pregnancy smoking. A second assessment was conducted to identify availability of targeted smoking cessation services for pregnant women through a 2014 survey. Only eight counties identified availability of local cessation services and only four targeted for pregnant women, beyond the telephone-based QUITLINE services, despite a Federal Medicaid requirement that those services be made available and accessible for enrollees.

County funded projects employed several important key elements as part of the intervention program design.

- Recruitment: Health departments identified existing smoking pregnant women users, used direct marketing to private health providers for referrals and sponsored community events targeting pregnant women. Two sample events were community baby showers and public CO screenings. As the outcomes of services demonstrated success, many health departments also integrated smoking cessation service recruitment into high-risk pregnancy home visiting bound programs to increase project reach and enrollment.
- Individualized services: Counselling, skills development and incentives were provided to individual women, emphasizing personal relationships between trained health department staff and patients.
- Protocols: Projects used the nationally accepted 5As protocol - *Ask, Advise, Assess, Assist, Arrange* – (USDHHS, Clinical Practice Guideline Treating Tobacco Use and Dependence, 2008 Update). This was integrated as a new pregnancy smoking cessation service into the array of traditional maternal and child health services already offered at county health departments.
- Trained staff: Supplementary training in Brief Motivational Interviewing (Miller, Rollnick, and Conforti. Motivational Interviewing Preparing People for Change, 2002) was provided for staff involved in the BMTF project. Other projects provided similar training for community providers.
- Incentives: All projects used incentives to encourage and reward cessation. BMTF awarded diaper vouchers linked to service visits that included regular CO monitoring to measures reduction in smoking. Other programs used similar models of incentives linked to accountable behavior change.
- Scope of services: All projects focused on cessation during the prenatal period. BMTF projects continued monitoring and provide incentives during the baby's first postpartum year, intended to reduce second and third hand smoke exposure for infants.
- Evaluation: To validate reductions in low birth weight births, TDH Office of Policy and Data Management matched names of mothers enrolled in BMTF program with the birth certificates. Birth record data for enrollees was aggregated and compared with outcomes for births to all mothers who smoked by county to calculate statistical differences and odds ratios for low birth weight births comparing those enrolled in the program with those not enrolled.

Findings

Health Outcome Changes

- Outcomes for smoking cessation percentages varied by project (see Table 2).
- 83% counties improved in pregnancy smoking percentages in 3 years, from 2013-2016.
- For pregnant women enrolled in BMTF program,

    - Cigarette use was reduced by 86% among high attenders (three or more prenatal visits) compared to 59% for low attenders (fewer than three prenatal visits) and compared to 52% reduction among non-enrolled women.
    - 38% of pregnant women stopped smoking during pregnancy, as verified by CO monitoring.
    - There were 53% fewer LBW births for high attenders compared to smoking mothers not enrolled in service (LBW rate: 5.8% versus 11.9%)
- In multiple rural counties, catastrophic home poisonings or fires were prevented through follow-up home visits by program facilitators prompted by pregnant women's' claims to have stopped smoking that were unsubstantiated by high CO readings, found to be caused by home gas leaks.
- Projects effectiveness and return on State funding investment are demonstrated through reduction in low birth weight births. Savings are calculated as the difference between hospital in-patient charges for normal births ($9,499 per birth) and charges for low birth weight births of ($107,631 per birth).

Process Outcomes

- Through three years of operation, the TN Tobacco Settlement Program pregnancy smoking prevention and cessation projects enrolled over 8,700 pregnant women, including almost 6,000 in the national BMTF and over 2,700 in other county-developed projects.
- Of all enrollees of BMTF, 22% became new patients of health departments, enabling women to receive a broad array of prenatal and postpartum services for themselves and infants.
- Health department employees valued specialized training in brief motivational interviewing, skills that prove valuable for other prevention services based upon enabling individual behavior change.
- All health department BMTF facilitators were trained in 5As. An additional 500+ community providers also received training through locally developed projects.
- 5As was the common new protocol for all pregnancy smoking cessation projects.
- Counties tested and demonstrated multiple tactics to increase enrollment: (1) outreach to community health providers to increase referrals; (2) offer educational trainings for other community health providers; (3) co-locate services with private medical practices; (4) bundle cessation services with health departments' homebased services for high risk pregnancies; and (5) include e-cigarettes education into personal training goals.

Discussion

Pregnancy smoking cessation is a traditional secondary prevention service, now required of state Medicaid plans and offered by many private health insurance plans. The absence of these services prior to 2014 speaks to the lack of a prevention infrastructure and inability/unwillingness of insurers to create care systems that include effective programs. TDH initiated cessation services are seen as a dual opportunity, for secondary prevention with smoking pregnant women, and primary prevention against infant illnesses. The BMTF 12-month postpartum voucher incentives encourage women and household members not to smoke following pregnancy.

Group project learning was facilitated by BMTF through quarterly facilitator conference calls during which model improvements were identified, discussed and offed for adoption. Results of a December 2014 process improvement PDCA cycle focused on strategies to retain women in services identified the strong negative influence of other smokers in household as a barrier to the woman's cessation and program retention. Counties operating BMTF led an operational adaptation, awarding an additional diaper voucher incentive to one another household member if they also quit smoking. A second program adaptation, designed to increase enrollment, was to offer cessation services as part of home-based visiting services for high risk pregnancies. These changes reflect the desire of county health department staff to be adaptable to improve effectiveness.

In reviewing their statewide success to reduce prenatal smoking percentages, counties identified design of a nurturing environment that matched caring staff individuals that want to help, with mothers when they are most motivated to quit. Projects were seen to fill a community health service gap with targeted and culturally-appropriate cessation services. Personal counselling was designed to increase the women's self-efficacy in making behavior change. The small incentives were important to promote self-confidence for behavior change. Patients knew services to expect and how to

meet expectations to be successful, and CO monitoring readings gave participants immediate, visual confirmation of success. Patients reported two significant household savings through success: savings in not buying tobacco products, and the deferred costs of diaper purchases when redeemed with awarded vouchers. Stories collected from clients consistently report the clear value of these dual financial benefits. The other benefit reported with the growing sense of self-efficacy among the pregnant women to take charge of their health and make their home environment smoke free.

In particular, the BMTF project was adopted early because of its sense of accountable service, incentive and outcomes. At the individual level, record of enrolled women's services was tracked and reported including CO readings which were understood as objective validation of success or failure of quitting. For BMTF projects, the Tennessee projects became part of a diaper voucher system under a national agreement with Walmart (later expanded in Tennessee for more local vendors). Prenumbered vouchers are tracked from disbursement to county health departments, through award to pregnant women and redemption at the retailer. Hospital report birth outcomes on all Tennessee birth certificates. These documents became the reliable primary source for low birth weight and premature birth data.

Pregnancy smoking and LBW outcome measures were generally understood and believed as achievable with county health department resources and effort. Measurable county-set goals were seen as easily achievable with three-year timeline. TDH created a simple Return on Investment model based only on inpatient normal and low birth weight births hospital charges. Each county used a simple calculation to express potential hospital savings for each pregnant woman who quit smoking. While rudimentary, the approach introduced the links between prevention services and health outcomes with cost savings. This was motivating for staff and provided an easily explainable example of the value of prevention.

Calculating a Return on Investment (ROI) for the BABY & ME Tobacco Free Projects through December 2016

Low birth weight (LBW) percentage was 51.3% lower for high attenders compared to all statewide non-enrolled women (5.8% versus 11.9%)
Preterm births percentage was 29.3% lower for high attenders compared to all statewide non-enrolled women (8.2% versus 11.6%)

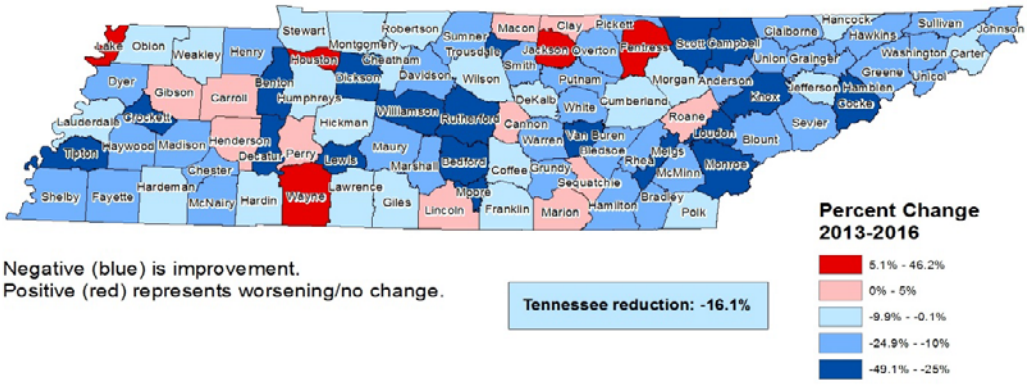
Based on statewide statistics for all women who reported smoking during pregnancy, 327 low birth weight births would be expected among BMTF-enrolled births. There were actually 250 LBW births, 77 fewer than expected.

2016 average Tennessee hospital inpatient charges for low birth weight births was $107,631 per birth.
2016 average Tennessee hospital inpatient charges for normal birth was $9,499 per birth. (from Hospital Discharge Database, 2016)

Hospital charges prevented = $98,132 x77 fewer than expected LBW births = $7,561,164

FIGURE 1: Map of changes in percent of pregnancy smoking by county, 2013-2016

Percent Change in Percentage of Women Smoking Reported on Birth Certificates by County of Residence, 2013-2016



Data Source: Birth Statistical Data System, 2013-2016. Office of Healthcare Statistics, Division of Policy, Planning and Assessment, Tennessee Department of Health. Nashville, Tennessee.

Table 2 Characteristics of Pregnancy Smoking Projects, Tennessee Tobacco Settlement Program 2014-16

Project Title	Number of Pregnant Women Enrolled	Project Services	Pregnancy Smoking Reduction
BABY&ME Tobacco Free (2014-16) 86 counties	5,306	Counselling and support services; diaper voucher rewards for cessation. Additional voucher for household member who quits.	35% reduction verified by CO testing. 70% quit rate for 3-4 prenatal visits.
Power to Quit Knox County	190	Group and individual counselling sessions with gift card incentives.	Self-reported 30% quit rate at delivery, 33% for first postpartum visit.
SMART Moms Rutherford, Smith, Trousdale counties	277	Intake, counselling and education session with incentives.	Self-reported 40% quit rate in Rutherford.
Smart MOMS Madison County	1,643	Intake, counselling and education session; diaper incentives for all pregnant non-smokers for being smoke-free, diaper incentives for all who commit to trying to quit and participate in 5 A's based counseling. Referral to existing cessation support services including TN Tobacco Quitline. Provider training with CMEs and CEUs.	Self-reported 78% reduction. Self-reported 41% quit rate in Rutherford.
Prenatal/Newborn Tobacco Initiative Hamblen County	477	Colorado Model using behavioral health consultants from Cherokee Health. Gift cards awarded.	Of 53 women referred to consultants 25% quit smoking.
Warren Nurturing Parents	24	16 two-hour counselling and education sessions focused on second hand smoke dangers	54% quit verified with CO readings.

TABLE 3: County-specific changes in pregnancy smoking percentages and changes, 2013-16

Percent of women smoking during pregnancy reported on birth certificates by county of residence 2013-2016

	Births with SMOKING 2013	Total Births 2013	Percent births with smoking	Births with SMOKING 2014	Total Births 2014	Percent births with smoking	Births with SMOKING 2015	Total Births 2015	Percent births with smoking 2015	Births with SMOKING 2016	Total Births 2016	Percent births with smoking 2016	Net percent change 2013-16
													Negative represents reduction in percent with smoking
Tennessee	12,776	79,954	16.0%	12,150	81,609	14.9%	11,545	81,374	14.2%	**10,788**	**80,755**	**13.4%**	-16.1%
Anderson	171	765	22.4%	175	802	21.8%	142	789	18.0%	**150**	**794**	**18.9%**	-15.5%
Bedford	149	603	24.7%	108	640	16.9%	119	586	20.3%	**116**	**637**	**18.2%**	-26.3%
Benton	53	168	31.5%	56	141	39.7%	57	174	32.8%	**34**	**144**	**23.6%**	-25.2%
Bledsoe	41	109	37.6%	30	119	25.2%	40	136	29.4%	**43**	**138**	**31.2%**	-17.2%
Blount	239	1,307	18.3%	178	1,322	13.5%	178	1232	14.4%	**184**	**1,230**	**15.0%**	-18.2%
Bradley	250	1,241	20.1%	235	1,206	19.5%	200	1147	17.4%	**206**	**1,207**	**17.1%**	-15.3%
Campbell	118	420	28.1%	99	421	23.5%	72	431	16.7%	**91**	**437**	**20.8%**	-25.9%
Cannon	31	130	23.8%	27	142	19.0%	41	168	24.4%	**39**	**157**	**24.8%**	4.2%
Carroll	78	305	25.6%	71	308	23.1%	73	316	23.1%	**80**	**304**	**26.3%**	2.9%
Carter	152	501	30.3%	151	532	28.4%	137	531	25.8%	**135**	**488**	**27.7%**	-8.8%
Cheatham	85	429	19.8%	103	469	22.0%	78	443	17.6%	**97**	**490**	**19.8%**	-0.1%
Chester	39	204	19.1%	43	208	20.7%	30	160	18.8%	**27**	**183**	**14.8%**	-22.8%
Claiborne	108	315	34.3%	94	330	28.5%	61	279	21.9%	**77**	**297**	**25.9%**	-24.4%
Clay	24	75	32.0%	22	74	29.7%	23	80	28.8%	**22**	**68**	**32.4%**	1.1%
Cocke	134	382	35.1%	124	398	31.2%	115	391	29.4%	**96**	**371**	**25.9%**	-26.2%
Coffee	195	661	29.5%	200	693	28.9%	216	711	30.4%	**192**	**672**	**28.6%**	-3.2%
Crockett	26	166	15.7%	29	182	15.9%	34	162	21.0%	**17**	**155**	**11.0%**	-30.0%
Cumberland	146	527	27.7%	156	548	28.5%	185	573	32.3%	**142**	**526**	**27.0%**	-2.6%
Davidson	843	9,911	8.5%	838	10,275	8.2%	768	10322	7.4%	**649**	**10,021**	**6.5%**	-23.9%
Decatur	39	136	28.7%	27	141	19.1%	35	112	31.3%	**23**	**118**	**19.5%**	-32.0%
DeKalb	55	222	24.8%	72	235	30.6%	63	246	25.6%	**46**	**190**	**24.2%**	-2.3%
Dickson	178	619	28.8%	153	625	24.5%	143	636	22.5%	**102**	**568**	**18.0%**	-37.6%
Dyer	114	452	25.2%	111	467	23.8%	114	471	24.2%	**105**	**471**	**22.3%**	-11.6%
Fayette	36	411	8.8%	48	424	11.3%	30	431	7.0%	**29**	**409**	**7.1%**	-19.1%
Fentress	47	187	25.1%	60	196	30.6%	52	185	28.1%	**53**	**199**	**26.6%**	6.0%
Franklin	105	406	25.9%	81	399	20.3%	86	379	22.7%	**96**	**404**	**23.8%**	-8.1%
Gibson	119	610	19.5%	151	623	24.2%	105	621	16.9%	**120**	**590**	**20.3%**	4.3%
Giles	82	317	25.9%	93	303	30.7%	89	359	24.8%	**84**	**332**	**25.3%**	-2.2%
Grainger	65	216	30.1%	62	247	25.1%	45	207	21.7%	**61**	**251**	**24.3%**	-19.2%
Greene	200	643	31.1%	201	651	30.9%	168	646	26.0%	**192**	**690**	**27.8%**	-10.5%
Grundy	47	177	26.6%	35	151	23.2%	40	157	25.5%	**33**	**150**	**22.0%**	-17.1%
Hamblen	176	760	23.2%	172	799	21.5%	149	756	19.7%	**146**	**755**	**19.3%**	-16.5%
Hamilton	523	4,170	12.5%	509	4,144	12.3%	455	4287	10.6%	**435**	**4,288**	**10.1%**	-19.1%
Hancock	23	62	37.1%	26	67	38.8%	25	67	37.3%	**29**	**79**	**36.7%**	-1.0%
Hardeman	43	274	15.7%	39	273	14.3%	50	265	18.9%	**40**	**257**	**15.6%**	-0.8%
Hardin	81	282	28.7%	68	257	26.5%	99	306	32.4%	**78**	**297**	**26.3%**	-8.6%
Hawkins	166	523	31.7%	145	538	27.0%	160	557	28.7%	**152**	**537**	**28.3%**	-10.8%
Haywood	46	237	19.4%	31	220	14.1%	35	191	18.3%	**33**	**194**	**17.0%**	-12.4%
Henderson	84	319	26.3%	82	328	25.0%	69	312	22.1%	**90**	**335**	**26.9%**	2.0%
Henry	126	352	35.8%	97	305	31.8%	85	345	24.6%	**98**	**333**	**29.4%**	-17.8%
Hickman	82	284	28.9%	81	283	28.6%	100	288	34.7%	**73**	**267**	**27.3%**	-5.3%
Houston	13	73	17.8%	23	96	24.0%	27	82	32.9%	**25**	**96**	**26.0%**	46.2%
Humphreys	50	198	25.3%	55	187	29.4%	56	207	27.1%	**46**	**190**	**24.2%**	-4.1%
Jackson	28	86	32.6%	20	90	22.2%	37	104	35.6%	**41**	**111**	**36.9%**	13.4%
Jefferson	104	500	20.8%	126	546	23.1%	91	531	17.1%	**96**	**488**	**19.7%**	-5.4%
Johnson	54	144	37.5%	43	189	22.8%	46	154	29.9%	**46**	**154**	**29.9%**	-20.3%
Knox	684	5,113	13.4%	532	5,255	10.1%	532	5358	9.9%	**494**	**5,269**	**9.4%**	-29.9%
Lake	20	63	31.7%	22	60	36.7%	22	70	31.4%	**23**	**67**	**34.3%**	8.1%
Lauderdale	62	288	21.5%	53	290	18.3%	54	298	18.1%	**65**	**332**	**19.6%**	-9.1%
Lawrence	103	560	18.4%	100	582	17.2%	121	570	21.2%	**96**	**554**	**17.3%**	-5.8%
Lewis	42	118	35.6%	45	155	29.0%	25	129	19.4%	**27**	**139**	**19.4%**	-45.4%
Lincoln	73	334	21.9%	76	339	22.4%	87	377	23.1%	**74**	**329**	**22.5%**	2.9%
Loudon	104	543	19.2%	81	510	15.9%	77	526	14.6%	**75**	**561**	**13.4%**	-30.2%
McMinn	156	589	26.5%	126	553	22.8%	159	576	27.6%	**129**	**568**	**22.7%**	-14.3%
McNairy	67	269	24.9%	71	260	27.3%	61	254	24.0%	**62**	**288**	**21.5%**	-13.6%
Macon	91	311	29.3%	87	342	25.4%	112	351	31.9%	**86**	**290**	**29.7%**	1.3%
Madison	172	1,256	13.7%	139	1,249	11.1%	150	1250	12.0%	**146**	**1,209**	**12.1%**	-11.8%
Marion	86	315	27.3%	94	324	29.0%	87	331	26.3%	**86**	**310**	**27.7%**	1.6%
Marshall	87	350	24.9%	107	380	28.2%	79	375	21.1%	**82**	**384**	**21.4%**	-14.1%

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Maury	188	1,045	18.0%	220	1,130	19.5%	191	1146	16.7%	**183**	**1,170**	**15.6%**	-13.1%
Meigs	59	136	43.4%	34	102	33.3%	35	145	24.1%	**32**	**115**	**27.8%**	-35.9%
Monroe	143	535	26.7%	117	527	22.2%	107	485	22.1%	**85**	**469**	**18.1%**	-32.2%
Montgomery	406	3,220	12.6%	413	3,453	12.0%	459	3441	13.3%	**400**	**3,437**	**11.6%**	-7.7%
Moore	9	59	15.3%	11	52	21.2%	5	50	10.0%	**5**	**46**	**10.9%**	-28.7%
Morgan	55	199	27.6%	62	209	29.7%	59	227	26.0%	**50**	**198**	**25.3%**	-8.6%
Obion	87	334	26.0%	82	315	26.0%	83	364	22.8%	**94**	**367**	**25.6%**	-1.7%
Overton	49	219	22.4%	50	227	22.0%	59	232	25.4%	**42**	**218**	**19.3%**	-13.9%
Perry	20	100	20.0%	31	121	25.6%	25	84	29.8%	**21**	**104**	**20.2%**	1.0%
Pickett	8	29	27.6%	8	49	16.3%	14	54	25.9%	**10**	**42**	**23.8%**	-13.7%
Polk	43	167	25.7%	41	177	23.2%	38	150	25.3%	**44**	**181**	**24.3%**	-5.6%
Putnam	188	888	21.2%	180	862	20.9%	171	919	18.6%	**155**	**867**	**17.9%**	-15.6%
Rhea	121	402	30.1%	121	384	31.5%	87	379	23.0%	**88**	**385**	**22.9%**	-24.1%
Roane	121	476	25.4%	109	433	25.2%	128	453	28.3%	**128**	**485**	**26.4%**	3.8%
Robertson	144	872	16.5%	173	884	19.6%	126	860	14.7%	**137**	**884**	**15.5%**	-6.2%
Rutherford	472	3,742	12.6%	432	4,001	10.8%	446	3958	11.3%	**376**	**4,129**	**9.1%**	-27.8%
Scott	77	296	26.0%	54	280	19.3%	42	277	15.2%	**36**	**272**	**13.2%**	-49.1%
Sequatchie	42	163	25.8%	42	152	27.6%	38	154	24.7%	**40**	**152**	**26.3%**	2.1%
Sevier	211	1,003	21.0%	191	1,075	17.8%	199	1058	18.8%	**179**	**1,086**	**16.5%**	-21.6%
Shelby	943	13,760	6.9%	910	13,842	6.6%	769	13377	5.7%	**691**	**13,219**	**5.2%**	-23.7%
Smith	59	241	24.5%	70	237	29.5%	40	210	19.0%	**57**	**262**	**21.8%**	-11.1%
Stewart	31	123	25.2%	38	130	29.2%	43	128	33.6%	**34**	**146**	**23.3%**	-7.6%
Sullivan	438	1,587	27.6%	391	1,575	24.8%	356	1525	23.3%	**358**	**1,488**	**24.1%**	-12.8%
Sumner	349	2,000	17.5%	382	2,122	18.0%	319	2106	15.1%	**300**	**2,053**	**14.6%**	-16.3%
Tipton	148	757	19.6%	121	710	17.0%	137	730	18.8%	**106**	**723**	**14.7%**	-25.0%
Trousdale	23	98	23.5%	23	97	23.7%	29	106	27.4%	**15**	**101**	**14.9%**	-36.7%
Unicoi	49	166	29.5%	45	147	30.6%	50	154	32.5%	**38**	**162**	**23.5%**	-20.5%
Union	55	185	29.7%	32	170	18.8%	54	225	24.0%	**51**	**213**	**23.9%**	-19.5%
Van Buren	27	62	43.5%	16	61	26.2%	15	78	19.2%	**14**	**58**	**24.1%**	-44.6%
Warren	122	507	24.1%	117	477	24.5%	100	463	21.6%	**96**	**464**	**20.7%**	-14.0%
Washington	282	1,327	21.3%	284	1,302	21.8%	253	1341	18.9%	**241**	**1,291**	**18.7%**	-12.2%
Wayne	33	132	25.0%	37	153	24.2%	37	132	28.0%	**36**	**137**	**26.3%**	5.1%
Weakley	82	349	23.5%	81	348	23.3%	75	343	21.9%	**84**	**359**	**23.4%**	-0.4%
White	89	317	28.1%	65	304	21.4%	58	291	19.9%	**75**	**302**	**24.8%**	-11.5%
Williamson	92	2,096	4.4%	90	2,149	4.2%	87	2263	3.8%	**68**	**2,268**	**3.0%**	-31.7%
Wilson	196	1,374	14.3%	194	1,459	13.3%	222	1468	15.1%	**205**	**1,528**	**13.4%**	-5.9%

Worksheet prepared for Tobacco Settlement Program WORKshop by Tennessee Department of Health, Division of Policy Planning and Assessment, 2016

Source: Birth Ceriticates